LIVERMORE LAB
REPORT

A weekly review of scientific and technological achievements from Lawrence Livermore National Laboratory, Nov. 4-8, 2013.

ClimateWire A PAUSE BY ANY OTHER NAME

Ice sheets are still melting as a result of climate change regardless of any possible warming pause.

A lot of people ask: “Has there been a pause in global warming because temperatures aren't increasing as fast as they were a decade ago?

Climate scientists dismiss this idea even though the average surface temperatures worldwide have not increased since around the turn of the century.

But sea levels still are rising; the ice sheets still are melting; the oceans still are getting more acidic -- just as they have since the turn of the century.

Benjamin Santer, a climate scientist at Lawrence Livermore National Laboratory, sees research into the pause in surface warming as a sort of scientific mystery that helps researchers better understand how the Earth's climate works. He thinks there are a few reasons for the surface warming slowdown, including natural climate variations, such as extra heat going into the ocean, which, as he pointed out, has continued to warm.

"There's this rich internal climate variability, so it's easily possible to get a short 10- or 15-year period with little or no [surface] warming, even with human-released greenhouse gases," Santer said.

To read more, go to ClimateWire.

HPC wire

FEE FI FO FUM

Catalyst, recently installed at Lawrence Livermore, will serve research scientists and provide a proving ground for new HPC and Big Data technologies and architectures.

When it comes to big data, Lawrence Livermore has made a name for itself.

Earlier this week, the Laboratory partnered with Intel and Cray and introduced a new, purpose-built system designed to tackle specific data-intensive problems using some unique approaches to addressing I/O issues for key "big data" applications in bioinformatics and beyond.

The new Cray CS300 324-node system, dubbed Catalyst, will be bestowed with its inaugural applications sometime in December. Delivered in October, the 150 teraflop cluster sports some notable specs.

To read more, go to HPCwire.

POPULAR SCIENCE

GETTING WAY CLOSER

A technician checks the diagnostics at the National Ignition Facility, which continues to make progress.

In a major first, an experiment at the National Ignition Facility got more energy out of its fuel than went into the fuel. It's one step closer to ignition, when the reaction becomes self-sustaining.

The NIF is home to the highest-energy laser in the world -- a composite of 192 lasers, all trained on one tiny pellet of the hydrogen isotopes deuterium and tritium. The pressure from the lasers is designed to compress the fuel pellet until the deuterium and the tritium fuse together, releasing a huge burst of energy. The process is designed to replicate the inside of a star, mimicking the sun's long-lasting, self-sufficient energy creation here on Earth for a potential supply of power.

Scientists have been working toward creating fusion energy in a lab setting for decades. Now, NIF has conducted an experiment in which the amount of energy released by the fusion reaction in the target was greater than the amount of energy that went into the pellet.

To read more, go to *Popular Science*.

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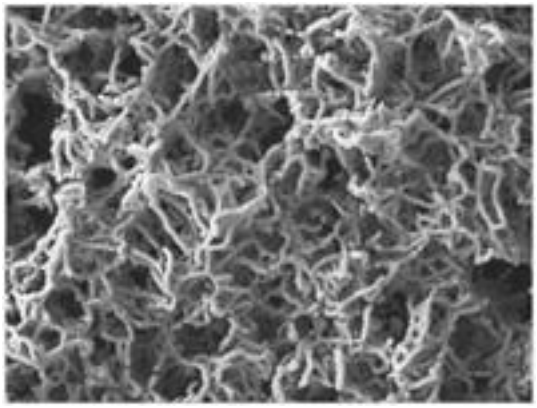
IT'S A NANOTUBE JUNGLE OUT THERE



The top view of the jungle canopy of nanotubes that may one day be used in portable devices.

Researchers from Lawrence Livermore National Laboratory (LLNL) and the Swiss Federal Institute of Technology (ETH) in Zurich have developed a new method of using nanotubes to detect molecules at extremely low concentrations enabling trace detection of biological threats, explosives and drugs.

The joint research team, led by LLNL Engineer Tiziana Bond and ETH Scientist Hyung Gyu Park, are using spaghetti-like, gold-hafnium-coated carbon nanotubes (CNT) to amplify the detection capabilities in surface-enhanced Raman spectroscopy (SERS).

Bond and Park hope their engineered material will eventually be used in portable devices to conduct on-site analysis of chemical impurities such as environmental pollutants or pharmaceutical residues in water. Other applications include the real-time point-of-care monitoring of physiological levels for the biomedical industry and fast screening of drugs and toxins for law enforcement.

To read more, go to Nanotechnology Now.

SCIENCE TODAY at the University of California

A BETTER VIRUS DETECTION

Salt may be the solution to determine what ails you.

The most conventional way to detect and identify viruses is to take a sample from a patient. But physicist Zuzanna Siwy of the University of California, Irvine, says the problem with this technique is the time that it takes to identify what virus infects the patient.

It might take over a week, which is really, really long time when a patient is waiting for results.

So, Siwy is working with colleagues at the Lawrence Livermore National Laboratory to come up with a safe, fast and cheap way to determine what bug ails you, and it involves salt. Their device includes a nanopore membrane (a membrane with a very small hole in it in which molecules can be blocked or pass through), a salt solution and a connection to a battery.

The salt will want to pass through the nanopore if the whole device is connected to a battery. Now imagine you have a virus in the solution as well. The virus will want to pass through the nanopore, but it is much larger than the salt. So, even a single virus will cause obstruction of the nanopore and the level of it will depend on the type of virus.

And the results could come back in an hour or less.

To hear the interview, go to Science Today.
